

# Utilizing Local Resources in the Teaching of High School Biology

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The chief objective of this paper is to demonstrate the integration of the use of local resources with certain phases of study illustrated in the textbook, "Biology In Daily Life," Curtis and Urban, 1949. In doing this there will be an endeavor to show how an average farm can fulfill the needs of such integration. The flora, fauna, habitats and other ecological conditions represented on a farm will provide a cross section of the living organisms around us. The objectives, evaluation, activities, and reconnaissances will be relative to and integrated with the book material. It is not the objective of this paper to answer or describe proposed objectives for each trip but to set them up for the teacher to use for discussing in detail the textbook and field trip activities that are pertinent to the phase of study.

The field trip is perhaps the best teaching method which makes it possible for students to observe and relate natural resources to their own daily living. There are many definite purposes toward which field trips may contribute. Dale (1954) lists a few of the major ones in the following:

"(1) To serve as a preview of a lesson and for gathering instructional materials. (2) To create teaching situations for cultivating observation, keenness, discovery to encourage children to see and know the things about them. (3) To serve as a means of arousing specific interests as in birds, trees, animals, the heavens and industrial processes. (4) To supplement classroom instruction; to secure definite information for a specific lesson. (5) To verify previous information, class discussions and conclusions, or individual experiments."

## *Planning the Trips*

*Administrative Details.* It is the writer's belief that Richardson and Cahoon (1951) have the most comprehensive lists of necessary administrative details for planning a field trip. They are as follows:

"(1) Approval of School Authorities. The approval of the principal or other official should be secured well in advance. (2) Arrangements with other teachers. If students are to miss other classes, the cooperation of the teacher concerned should be enlisted far enough in advance that necessary modification of their plans is possible. (3) Permission of parents. The school requires that parental permission be given in writing. (4) Transportation. School buses, chartered buses, and public vehicles are generally to be preferred to privately owned automobiles. (5) Conduct. Standards of conduct should grow out of group agreement as to what is desirable and reasonable."

The prescribed objectives could be divided and groups formed to note and answer them. Also certain people could be given specific responsibilities such as, distributing and securing equipment, collecting and caring for specimens. A well planned schedule, describing the total situation and the duties of each class member, helps reduce the possibility of dangers. Careful class planning will prevent many potential obstacles and disasters from becoming realities.

*Reconnaissance of the Area.* The teacher should be familiar with the area the group intends to visit. He should determine the trip's major objectives and the benefits that the students will derive from it. The following are some proposed objectives he must consider.

- (1) Is it located near enough to school so it will not take too long to get there?
- (2) Is the area free of unnecessary hazards?
- (3) Are examples of biological principles that are indicated in the textbook obvious?
- (4) Does the area provide an abundance of natural resources relative to the study?
- (5) What special equipment may be needed?
- (6) What sites can be chosen for each group to observe?
- (7) How familiar is the teacher with the flora and fauna represented?

- (8) Can a lesson plan be constructed which will consider the resources represented that are relative to the phase of study?

*Teacher-Student Preparation.* The benefits and objectives derived from a field trip are dependent upon previous student-teacher planning. The teacher serves as counselor and guide for helping the students to define the objectives as the trip.

*Preview of the Trip.* In previewing the following procedures are to be related to the textbook and workbook used by the class:

- (1) Give each student a mimeographed copy of the objectives of the trip.
- (2) Explain the relationship of objectives for the course of study.
- (3) Describe what biological principles may be observed.
- (4) Be sure each student knows to what group he is assigned and what his specific duties are.

*Mechanics of the Trip.* It is imperative for the teacher to know what personal preparations are necessary. The following is a list that can be utilized as a check sheet. This was compiled by Richardson and Cahoon (1951):

“(1) All students should receive or have copies of necessary guide sheets or direction sheets with clear indication of meeting place, time or departure, dress, and other pertinent items, such as objective sheet for the proposed trip. (2) Essential class and personal equipment should be checked before starting. (3) All details for transportation should be arranged in advance, so that such items as drivers, routes, stops, time schedule, and return trip are clear. (4) Necessary guides and groups should be arranged. (5) Rest periods should be fairly frequent and students should know the location of rest rooms. (6) Adequate supervision should be provided at dangerous points. (7) Suitable provisions and variations from schedule should be made for individual interests. (8) Breeches of agreed upon conduct should be checked immediately.”

#### *Description of Habitat*

I have chosen a typical midwestern farm on which to conduct the field trips outlined on the following pages. A farm of the diversified live stock and crop types that will illustrate the

majority of biological principles within its habitat should be best suited for field work of this nature.

*Description of farm layout.* The farm has been divided by fences into the following areas:

- (1) Barns, feed lots, and holding area.
- (2) Garden and orchard area.
- (3) Cultivated fields in which crop rotation is carried on.
- (4) Pasture area which includes: creek, ponds, oak-hickory habitat, and meadows.
- (5) Permanent legume area for silage and hay crops.

#### *Field Trip I*

##### *Problems and Characteristics of Living Things*

This study will consist of a trip throughout the farm. Each student will possess a map on which will be shown the following: the topography, the streams, the roads, the buildings and outline of crop fields, pastures and wooded areas. A map of this type may be acquired at the local farm bureau office.

The student will use different areas of the farm for approaching the proposed objectives of this particular phase of study; both for the present and future field trips. He should record the following on his map: (1) Crop found in each field. (2) Topographic features. (3) Dwelling area. (4) Livestock dwelling area. (5) Inhabitants; all observed animals. (6) Type of farming carried on.

*Objectives for present trip.* (1) To identify as many living organisms as possible. (2) To determine some relationship existing between plants and animals within a habitat. (3) To discover the distribution of living organisms in the area. (4) To identify and describe general factors that may affect the population of *specific* organisms. (5) To describe effect of introducing a new species into the habitat. An example would be the introduction of rabbits into Australia. (6) To choose several plants and animals and note distinguishing characteristics of each. (7) To compare the simplest forms of life observed with more complex forms. (8) To introduce methods for classifying plants and animals and to learn to classify the major organisms observed. (9) To describe the importance of the farm habitat to man.

**Field Trip II****Conservation of Biological Resources**

The areas observed will be the pasture with the pond, the creek, and east section of the pasture that is eroded.

*Objectives for the field trip.* (1) To define the relationships between biology and conservation. (2) To observe evidence of biological principles. (3) To note physical and chemical changes of the soil. (4) To identify evidences of soil erosion. (5) To describe the value of water to living organisms. (6) To note the role water plays in conservation. (7) To note evidence of wildlife, identifying if possible, each observed. (8) To describe how wildlife can affect conservation practices. (9) To note evidence of how plants and animals affect the conservation of each. (10) To observe man's effect on the habitat observed.

**Field Trip III****The World's Food Supply**

The area of the field trip will be the grain storage bins, the oak-hickory area in the pasture and the bean field.

*Objectives for the field trip.* (1) To collect and identify chlorophyll bearing plants. (2) To identify two groups of plants (monocots and dicots) by their seed structure. (3) To note evidences of respiration. (4) To observe green in the plant leaves and stems. (5) To note evidences of respiration. (6) To observe the structure of the stems of plants. (7) To distinguish structural difference between monocot and dicot plants. (8) To note and identify evidences of plants that have stored energy foods. (9) To note physical characteristics of soil in the fields. (10) To find evidences of the action of enemies of plants. (11) To make suggestions for corrective measures against observed plant enemies. (12) To list a few major biological principles exemplified here.

**Field Trip IV****Food and Life**

The areas on the farm that we will observe will be the barn, feeding lot, and nearby pasture. We will be able to see evidences of

the relationship of the essential energy foods of one organism with those of another.

*Objectives for the field trip.* (1) To describe observed plants and animals that are used as energy foods by other organisms. (2) To identify and explain where non-energy foods are found. (3) To find evidences where each type of food has been utilized by another organism. (4) To note limbs of trees and plants that have been broken or eaten. Find evidence of regeneration. (5) To answer the question, "How do observed animals use energy?" (6) To compare activities of various animals. (7) To identify biological principles that can be noted.

**Field Trip V****Behavior of Living Things**

The area observed during this field trip will consist of: the barn and lot, the chicken dwelling, and the oak-hickory habitat that joins the barn lot.

*Objectives for the field trip.* (1) To identify domesticated animals and wildlife and to note their relation to man. (2) To note types of responses observed. Note how they retreat upon your arrival into their area. (3) To describe behavior characteristics of the animals, plants, and birds observed. (4) To note stimuli that cause responses. (5) To identify certain behaviors related to survival. Note the diggings where rabbits retreated from their enemies. (6) To describe how animals and especially birds with respect to their structures and their functions are similar to man. (7) To describe how the activities of one organism may affect the response of others. (8) To find evidences that indicate that plants are living organisms!

**Field Trip VII****Life Continues from Age to Age**

The area of the trip will include the barn lot and the chicken house. We will also visit the hedgerow next to the pasture to find evidences of plant growth.

*Objectives for the field trip.* (1) To note evidences or reproduction in animals and plants. (2) To identify methods of reproduction in plants. (3) To observe conditions which affect reproduction. (4) To observe

evidence of a sexual and sexual reproduction. (5) To identify living organisms having alternation of generations. (6) To note how living things change from generation to generation. (7) To identify characteristics that can be inherited. (8) To note how plant and animal reproduction is similar. (9) To identify major biological principles that are related.

### *Field Trip VIII* *Kinds of Life*

On this trip the group will endeavor to identify many of the different kinds of life represented on the farm. In doing this each group of students will choose an area most likely to reveal the group or class of living organisms they are assigned to study. One group will observe the oak-hickory habitat in the pasture region, another group the barn yard, another group the creek and field adjacent to it.

*Objectives of the field trip.* (1) To observe and identify characteristics of vertebrates. (2) To note similar physical characteristics of two species which are unlike ecologically. (3) To describe ecological similarities of species unlike physically. (4) To find plant and animal evidences of descent with modification. (5) To identify as many phyla and classes of organisms as possible within the time allotted. (6) To describe characteristics that show how certain physically unlike species may be related phylogenetically. (7) To describe how certain organisms have adapted themselves to their environment. (8) To describe how biological principles observed here are related to the objectives of this trip.

### *Evaluation Techniques*

In evaluating a field trip the teacher must decide whether or not it has fulfilled the need for which it was originally intended.

*Techniques.* In considering the field trips and objectives that have been described and set up relative to the textbook, "Biology in Daily Life," the teacher should choose a measuring device below that can best be adapted to the objectives of each field trip.

(1) Evaluation by paper and pencil devices. (2) Analysis of work products according to acceptable criteria (apparatus setups, notebooks, student collections, committee reports,

etc.) (3) Classroom questioning and discussion. (4) Observation of significant behavior. (5) Conferences and interviews with individuals or with small groups.

### *Conclusion*

Curtis and Urban (1949) have indicated a need for a study such as this one in the following statement. "The results of several recent studies reveal that the illustrations of textbook function with relatively little effectiveness as learning aids to pupils, and that most pupils disregard them as materials for study."

The utilization of natural resources, within a community, to supplement the textbook tends to motivate student interest in biology subject matter. This is accomplished because many pupils are usually familiar with the local habitat and the proposed study area may have some relationship to their daily living.

In the methods, procedures, and devices for planning a field trip which have been listed in the study, I have endeavored to indicate a guide for the science teacher. This guide may be modified to fit almost any science teaching situation which could benefit from a field trip experience.

By using the textbook, "Biology in Daily Life," I have set up a series of field trips which seem appropriate for use in studying the different subject matter divisions of biology. The objectives that are set up relative to each field trip will also prove valuable for review purposes.

This paper is a condensed summary of an original that treats the subject extensively enough to help a teacher set up an entire year of field trips relative to Curtis and Urban's text. If anyone is interested in a complete copy of the manuscript, contact the author.

### *References*

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